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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/623,757	07/21/2003	Jin Zhao	TI-35855	4854

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EXAMINER	
SMITH, FRANCIS P	
ART UNIT	PAPER NUMBER
1792	

NOTIFICATION DATE	DELIVERY MODE
10/03/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspto@ti.com

Office Action Summary	Application No.	Applicant(s)	
	10/623,757	ZHAO ET AL.	
	Examiner	Art Unit	
	Francis P. Smith	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 July 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,13-18 and 20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,13-18 and 20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 5, 2008 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 4, 16, and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, these claims refer to "establishing a parameter related to the flow of the cleaning gas according to a mathematical relation." The specification does not expressly identify said mathematical relation. Page 8, lines 18-27 state that the processor may measure the volume of cleaning gas introduced into the reactor chamber by establishing the volume of cleaning gas flowing per time unit and then measuring the time in order to determine the volume of cleaning gas introduced into the chamber. For examination purposes, the mathematical relation is interpreted as the flow rate per unit time.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-6, 13-18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao et al. (US 6,189,482 B1).

Regarding claims 1, 13, and 20, Zhao teaches methods for depositing titanium films at rates up to 200 Å/min on semiconductor substrates via PECVD (e.g. depositing one or more layers outwardly from an inner surface of a reactor chamber of a chemical vapor deposition system, the one or more layers forming/calculating an accumulation layer as per claims 2, 3, 14, and 15) (see abstract). After the desired film has been deposited, the source reactant gases are turned off and a plasma purge sequence acts to loosen larger particulates formed on the chamber and various chamber components (col. 37, lines 44-56). In addition to the plasma purge clean done after each wafer deposition, additional cleaning procedures are utilized to avoid wafer contamination, which is conducted after every "X" wafers (preferably 1-25 wafers) (col. 38, lines 1-8). Chlorine and argon gas are flowed into the chamber at a rate of about 200 sccm, which will assist with cleaning plasma formation. The plasma is struck at about 400 watts and held for about 80 seconds, during which time the chlorine species reacts with unwanted deposits to etch said deposits from the chamber components (analogous to performing a plasma clean cycle by introducing the cleaning gas into the reactor chamber and establishing that the accumulation layer has reached a specified thickness. The volume of cleaning gas used will be known from the specified flow rate for a given time period, e.g. establishing a volume per time of flow of the cleaning gas/measuring the duration of the flow of the cleaning gas during the one or more plasma clean cycles to yield a measurement as per claims 1, 4, 5, 16, and 17) (col. 38, lines 14-43). Scheduled

maintenance cleanings may be performed may be performed by opening the chamber lid to manually clean various parts of the chamber after about every 100-1000 processed wafers, which is analogous to scheduling a chamber maintenance procedure after a predetermined time (col. 38, lines 53-57).

Zhao does not explicitly state providing notification/scheduling a maintenance procedure once a predetermined volume of cleaning gas is used. However, Zhao does teach the use of a process sequencer subroutine that is designed to take into consideration the present condition of the process chamber being used in comparison with the desired process conditions for a selected process (col. 15, line 49-col. 16, line 5). A processor controls the operation of the chamber and subsystems according to instructions stored in memory via control lines. The processor executes system control software, which is a computer program stored in memory coupled to said processor (i.e. the software embodied in software as per claims 13-18). A process gas control subroutine has a program code for controlling process gas compositions and flow rates. The process gas control subroutine operates by opening the gas supply lines and repeatedly reading the necessary mass flow controllers, comparing the readings to the desired flow rates received from the chamber manager subroutine, and adjusting the flow rates of the gas supply lines as necessary. Steps are included for monitoring the gas flow rates for certain conditions (col. 16, line 56-col. 17, line 13). Thus, as Zhao teaches plasma clean cycles while monitoring the cleaning gas flow rate per unit time via the process gas subroutine, the claimed elements were known in the art at the time of the invention. Since person of ordinary skill has good reason to pursue the known

options within his or her technical grasp, it would have been obvious to correlate the chamber cleaning cycles with the cleaning gas volume in order to monitor the amount of cleaning gas used for inventory purposes with anticipated success.

As per claims 6, 18, and 20, Zhao does not expressly state replacing chamber parts during the maintenance procedure, however, it is well known and within the level of ordinary skill in the art to replace chamber parts once they become damaged, especially during scheduled maintenance.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Francis P. Smith whose telephone number is (571) 270-3717. The examiner can normally be reached on Monday through Thursday 7:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mikhail Kornakov can be reached on (571) 272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/F. P. S./
Examiner, Art Unit 1792

/Michael Kornakov/
Supervisory Patent Examiner, Art Unit 1792